

IN THE CLAIMS:

1. (Currently amended) An optical sensor for monitoring combustion processes in a combustion chamber, comprising: ~~at least consisting of~~
a lens system (1, 2) facing the combustion chamber,
a waveguide (5) and
a sheath (4) surrounding the lens system and one end of the waveguide,
~~characterized in that~~ wherein the lens system (1, 2) comprises at least one essentially plano-concave lens (1) and a double concave lens (2) wherein the planar face of the plano-concave lens (1) is exposed to the combustion chamber.
2. (Currently amended) A sensor according to claim 1 ~~characterized in that~~ wherein the angular coverage of the lens system (1, 2) is at least in a range of 130°, preferably at least 135°, in particular up to 140°.
3. (Currently amended) A sensor according to claim 1 ~~characterized in that~~ wherein the lenses (1, 2) are composed of sapphire or quartz glass.
4. (Currently amended) A sensor according to claim 1 ~~characterized in that~~ wherein at least the plano-concave lens (1) at its surface area is surrounded by a metal plating.
5. (Currently amended) A sensor according to claim 4 ~~characterized in that~~ wherein the plano-concave lens (1) is fixed to the sheath (4) by means of a soldering material.
6. (Currently amended) A sensor according to claim 1 ~~characterized in that~~ wherein the lens system (1, 2) has a maximum diameter of < 8 mm, preferably of < 5 mm, in particular of < 2.4 mm.

7. (Currently amended) A sensor according to claim 1 ~~characterized in that~~
wherein the length of the lens system (1, 2) which has to be passed by the light is at
most equal to the ~~diameter, preferably between 50 and 75% of the diameter of the lens~~
system (1, 2).

8. (Currently amended) A sensor according to claim 1 ~~characterized in that~~
wherein the outer diameter of the sheath (4) is at most 10 mm, ~~preferably at most 6.5~~
~~mm, in particular about 3.5 mm.~~

9. (Currently amended) A sensor according to claim 1 ~~characterized in that~~
wherein the sensor can be assembled in a spark plug or in a heater plug.

10. (Currently amended) A sensor according to claim 1 ~~characterized in that~~
wherein the slackness (3) between the outer radius of the lenses (1, 2) ~~[[und]]~~ and the
inner radius of the sheath (4) is less than 10 μm , ~~preferably about 5 μm .~~

11. (Currently amended) A sensor according to claim 3 ~~characterized in that~~
wherein at least the lens (1) facing the combustion chamber is fixed by means of a
soldering material to the sheath (4) ~~in the area of the gap (3).~~

12. (Currently amended) A sensor according to claim 1 ~~characterized in that~~
wherein the sheath (4) is made of a material able to withstand a continuous temperature
load of 600°C and a momentary temperature load of 950°C.

13. (Currently amended) A sensor according to claim 1 ~~characterized in that~~
wherein the sheath (4) is made of a material having a coefficient of thermal expansion in
the range of 0 to 400°C of less than $10.5 \cdot 10^{-6} \text{ K}^{-1}$, ~~particularly of less than $7 \cdot 10^{-6} \text{ K}^{-1}$.~~

14. (Currently amended) A method for the centering of one or more lenses (1,
2) and a waveguide (5) in a sheath (4) of an optical sensor for the monitoring of

combustion processes in a combustion chamber ~~characterized in that~~ wherein the gap (3) between the outer radius of the lenses (1, 2) and the inner radius of the sheath (4) is less than 10 μm , ~~preferably about 5 μm~~ , and that the gap (3) is filled with a soldering paste and that the deviation of the axial orientation of the waveguide (5) and the lens system (1, 2) is less than 10 μm , ~~preferably less than 5 μm~~ .

15. (Currently amended) The method according to claim 14 ~~characterized in that~~ wherein a deep-drawn sheath (4) is used.

16. (Currently amended) The method according to claim 14 ~~characterized in that~~ wherein the sensor comprises a lens system (1, 2) having at least two lenses (1, 2).

17. (Currently amended) The method according to claim 14, ~~characterized in that~~ wherein the sensor consists of at least a lens system (1, 2) facing the combustion chamber, a waveguide (5) and a sheath (4) surrounding the lens system and one end of the waveguide wherein the lens system (1, 2) comprises at least one essentially plano-concave lens (1) and a double concave lens (2) and wherein the planar face of the plano-concave lens (1) is exposed to the combustion chamber.

18.- 20. (Cancelled).

21. (Currently amended) The method according to claim ~~[[20]]~~ 14, ~~characterized in that~~ wherein the plano-concave lens (1) is fixed to the sheath (4) by means of a soldering material.

22.-24. (Cancelled).

25. (Currently amended) The method according to claim 17, ~~characterized in that~~ wherein the sensor can be assembled in a spark plug or in a heater plug.

26. (Cancelled).

27. (Currently amended) The method according to claim ~~[[19]]~~ 14, characterized ~~in that~~ wherein at least the lens (1) facing the combustion chamber is fixed by means of a soldering material to the sheath (4) in the area of the gap (3).

28.-29. (Cancelled).